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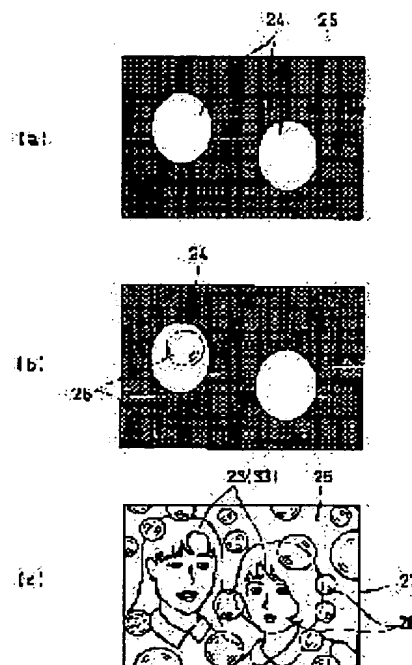
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(54) PERSON IMAGE PROCESSOR

(57)Abstract:

PROBLEM TO BE SOLVED: To add decoration with the decoration prevented from overlapping on a body part area such as a face and a head by providing a means which sets the position and area of the body part area and a means which selects a background area and adds decoration.

SOLUTION: Plural kinds of reference templates are preliminarily prepared and pattern matching is carried out while scanning on a personal image that is an original image. And, the range of a facial part area 23 is set. Further, an elliptical facial area 24 having a fixed size is assumed based on the position and range of the area 23 and the background area 25 of the personal image except the area 24 assumed in accordance with the area 23 is specified as an area that can be decorated. And, decoration that is preliminarily selected in the step of synthetic frame selection, e.g. a single pattern 26 is arranged at every random position while changing its size and is added to the specified area 25. In such a case, the pattern 26 is controlled not to be arranged at the area 24 corresponding to the area 23.



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CLAIMS

[Claim(s)]

[Claim 1] Portrait image-processing equipment characterized by having a means to set up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image, and a means to choose the background region except the body subregion and to add an ornament.

[Claim 2] Portrait image-processing equipment characterized by having a means to set up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image, and a means to choose the background region except the body subregion and to perform image transformation processing.

[Claim 3] Portrait image-processing equipment characterized by having a means to set up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image, and a means to add an ornament along the periphery enclosure of a body subregion.

[Claim 4] Portrait image-processing equipment characterized by having a means to set up the position and range of a body subregion based on the beige portion of a portrait image, and a means to choose the background region except the body subregion and to add an ornament.

[Claim 5] Portrait image-processing equipment characterized by having a means to set up the position and range of a body subregion based on the beige portion of a portrait image, and a means to choose the background region except the body subregion and to perform image transformation processing.

[Claim 6] Portrait image-processing equipment characterized by having a means to set up the position and range of a body subregion based on the beige portion of a portrait image, and a means to add an ornament along the periphery enclosure of a body subregion.

[Claim 7] It is portrait image-processing equipment which it is portrait image-processing equipment indicated to either the claim 1 or the claim 6, and a body portion is a face portion, and is characterized by a body subregion being a face subregion.

[Claim 8] It is portrait image-processing equipment which it is portrait image-processing equipment indicated to either the claim 1 or the claim 6, and a body portion is a part for a head, and is characterized by a body subregion being a head part field.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention starts portrait image-processing equipment, and relates to the portrait image-processing equipment used including in the play device which prints and outputs portrait images, such as a user's face and the whole body, to various kinds of print media especially.

[0002]

[Description of the Prior Art] It compounds, after laying portrait images which it finished photoing, such as a user's face and the whole body, with ornament frames, such as a pattern and a pattern, on top of the inside of this kind of play device. And there is a seal vending machine considered as the composition printed and outputted to the print media called seal, and in recent years, the play device which can add a pattern like scribble on a synthetic picture is also developed, using input meanses, such as a tablet. Or when the blue sheet (curtain) has been beforehand arranged to a user's tooth-back side again, a photograph is taken, and there are some which were considered as the composition which chooses a sheet and a corresponding background region and adds the ornament of a pattern, a pattern, etc.

[0003]

[Problem(s) to be Solved by the Invention] By the way, in the aforementioned conventional play device, in spite of having adjusted so that a portrait image might be settled in an ornament frame, in order for ornaments to overlap and for the amount of [the face portion of a portrait image,] head etc. to hide, un-arranging [that it can be hard to obtain a portrait image with a clear face portion etc.] has arisen. In addition, same un-arranging is to produce what scribble wrote and was considered as the composition in which **** is possible. In the thing of composition of, choosing a blue sheet and a corresponding background region on the other hand, and adding an ornament, since the range which can add an ornament will be restricted inevitably, use which adds an ornament also to a face portion effective in detection of a person or the body portion except a part for a head, and raises play nature was not completed.

[0004] this invention takes an example inconvenient [these] and is originated. The body portion of a portrait image, After making it an ornament not lap with the body subregion especially set up corresponding to the face and head, it is possible to add an ornament, and it aims at offer of portrait image-processing equipment which can aim at use expansion of a play device after raising play nature more.

[0005]

[Means for Solving the Problem] Here, after giving explanation of the term indicated to the claim, and explanation of technical thought, a The means for solving a technical problem is explained.

[0006] A "portrait image" is a picture in which a person's part or all pictures are included.

Therefore, the whole person's picture is sufficient and you may be the picture of only a person's face and the sight of your back, or the upper half of the body. Moreover, the picture to which two or more persons are reflected is sufficient. Of course, what patterns, such as scenery other than a person and a pattern, may be in a background.

[0007] It will be called a body portion if a "body portion" is a meaning called a part of a person's

body, and it is a portion which it can recognize that it is a part of human being's body even if it has equipped the body portion with dress, a hat, or shoes and the skin cannot be seen.

Therefore, a face is a body portion and the head is also a body portion. Furthermore, an eye, a nose, a mouth, an ear, eyebrows, hair, a neck, the upper half of the body that had dress on, a hand, an arm, a leg, the leg that wore shoes, the head which was wearing the hat, the eye which hung spectacles are body portions.

[0008] A "body subregion" may be a field set up noting that a body portion is the field occupied on a picture, and even if the body subregion contains except the body portion in the interior, it may be a field set up inside a body portion. That is, supposing a body portion is a face, some fields in the circumference of a face may be included, and the body subregion corresponding to a face is the rectangle of the minimum size surrounding both eyes, a mouth, and a nose, and may contain neither a frame nor an ear.

[0009] An "ornament" may be a picture pattern added, and this picture pattern may be a picture pattern currently held beforehand, and may be a picture pattern generated with computer graphics technology. Moreover, this picture pattern may be a character, the pattern of a sign, and a pattern of a figure.

[0010] All processings that "image transformation processing" considers a picture as an input like concentration conversion of a picture, or filtering and affine transformation, and output a picture are said.

[0011] Hereafter, a The means for solving a technical problem is explained succeedingly.

[0012] The portrait image-processing equipment concerning the claim 1 of this invention is characterized by having a means to set up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image, and a means to choose the background region except the body subregion and to add an ornament. And since an ornament is not added within the limits of the body subregion set up based on the element which constitutes a body portion according to this composition, it will be lost that a body portion overlaps an ornament and it will not happen that a body portion hides by the ornament.

[0013] The portrait image-processing equipment concerning the claim 2 of this invention was equipped with a means to set up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image, and a means to choose the background region except the body subregion and to perform image transformation processing, and was constituted. Since according to this composition the background region except the range of a body subregion is chosen and image transformation processing can be performed, it becomes possible by gradating the color of a background region or making it change to make a body portion conspicuous.

[0014] The portrait image-processing equipment concerning the claim 3 of this invention is characterized by having a means to set up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image, and a means to add an ornament along the periphery enclosure of a body subregion. Since an ornament is added along the periphery enclosure of the set-up body subregion according to this composition, while emphasizing especially a body portion and making it conspicuous, the advantage of becoming possible to raise play nature is secured.

[0015] The portrait image-processing equipment concerning the claim 4 of this invention A means to set up the position and range of a body subregion based on the beige portion of a portrait image, While it has a means to choose the background region except the body subregion and to add an ornament, the portrait image-processing equipment concerning a claim 5 It has a means to set up the position and range of a body subregion based on the beige portion of a portrait image, and a means to choose the background region except the body subregion and to perform image transformation processing. Moreover, the portrait image-processing equipment concerning a claim 6 is equipped with a means to set up the position and range of a body subregion based on the beige portion of a portrait image, and a means to add an ornament along the periphery enclosure of a body subregion. Therefore, according to these composition, the same advantage as each of a claim 1 or a claim 3 will be secured.

[0016] The portrait image-processing equipment concerning the claim 7 of this invention is

indicated to either a claim 1 or the claim 6, a body portion is a face portion, and the body subregion is characterized by being a face subregion. Since it becomes possible to add the ornament same also about the body portion except the face portion effective in detecting a person as a background region, to perform image transformation processing, or to add an ornament along the periphery enclosure of a face subregion when this composition is adopted, play nature can be raised more.

[0017] Like the portrait image-processing equipment which the portrait image-processing equipment concerning the claim 8 of this invention also requires for a claim 7, it indicates to either a claim 1 or the claim 6, and a body portion is a part for a head in this claim 8, and the body subregion is a head part field. Therefore, according to this composition, the advantage that it becomes possible to prevent that the head part field included in a body subregion overlaps an ornament, and to make the amount of head conspicuous is secured.

[0018]

[Embodiments of the Invention] Although the portrait image-processing equipment concerning this invention is explained hereafter, first, the whole seal vending machine composition and operation for which it is used by this portrait image-processing equipment, incorporating and which are a play device are explained. That is, it is explanatory drawing which drawing 1 simplifies the hardware composition of a seal vending machine, and is illustrated, and the block diagram which drawing 2 simplifies the functional module composition, and is illustrated, and drawing 3 is a flow chart which illustrates the fundamental game processing sequence.

[0019] It has a video camera 1, a personal computer 2, the seal printer 3, the coin mechanism 4, CRT5, and a one-way mirror 6, and the seal vending machine which is a play device is constituted so that it may illustrate by drawing 1 and drawing 2, and these each is arranged after positioning inside the main part 9 of a device possessing the control panel 7 and the electric power switch 8. And the video camera 1 here photos a user's picture, a portrait image is transmitted to a personal computer 2, a personal computer 2 operates as control means which realize various kinds of functions, and the seal printer 3 is printing the synthetic picture transmitted from the personal computer 2 to seal paper.

[0020] That is, as a function which a personal computer 2 realizes, there are recognition of the panel operation which detection of the injection number of sheets of coin, the sequence control of a game, and a user perform, and switch operation, lighting of lighting fitting and putting-out-lights control, acquisition of a camera picture, picture composition, a picture output to a seal printer, etc. And main control-section 2a which constitutes this personal computer 2 controls acceptance of coin, and advance of a game. The coin mechanism in which I/O board control-section 2b is an external instrument, and a control panel, While the signal I/O between lighting fitting is controlled and picture control-section 2c is controlling acquisition directions of a picture, composition of a set photograph, the display of a synthetic picture, and maintenance of a synthetic pattern 2d of video-camera control sections controls the field angle of a video camera, exposure, and automatic setting of a focus, and video capture control-section 2e is controlling acquisition of a picture.

[0021] Moreover, the coin mechanism 4 is what detects an injection of coin and transmits a coin injection signal to a personal computer 2. The video signal with which CRT5 has been outputted from the personal computer 2, For example, it is what carries out a screen display of the video signals corresponding to advance of a game, such as operation guidance and a camera picture. A one-way mirror 6 makes even a video camera 1 penetrate a user's picture, and it reflects the screen of CRT5, a user is made to check it by looking, and a control panel 7 transmits a switch signal to a personal computer 2, after receiving switch operation of a user. In addition, each of the signs 10 and 11 in drawing 1 is the fluorescent lamp and halogen lamp as lighting fitting, while the light is switched on at the time of photography that these should acquire a user's picture in the better state, the sign 12 in drawing 1 is a sheet for outdoor daylight interception (curtain), and this sheet 12 for outdoor daylight interception is arranged beforehand at a user's tooth-back side.

[0022] Next, it is premised on the play mode chosen by the user here being photograph mode, and being the picture composition mode which moreover compounds the portrait image photoed

by the user and an ornament although the operations sequence at the time of the play mode of a seal vending machine is explained briefly, referring to the flow chart shown by drawing 3. In addition, the play mode which a seal vending machine has is various, and it is not limited only to photograph mode and, of course, there are the modes other than picture composition mode, for example, the mode of only a photograph etc., also in the inside in photograph mode.

[0023] First, at the step of the waiting for a coin input, after the electric power switch 8 was turned on, when it was continuing waiting for the injection of coin and coin was thrown in by the user, displaying a demonstration picture on the screen of CRT5, after checking that the coin of predetermined number of sheets had been thrown in, displaying supplied coin number of sheets, a game is started. And when a game is started, on the screen of CRT5, the sample of an ornament frame including the ornament of the ornament frame which should be combined with a portrait image, i.e., a pattern, a pattern, etc. will be displayed covering two or more kinds, and after operating the tablet prepared in the control panel 7, at the step of synthetic frame selection, a user will choose arbitrary ornament frames.

[0024] Then, at the step of a selection result check, an ornament frame [finishing / selection] will be expanded and displayed on the screen of CRT5, and it is checked whether a user rechooses an ornament frame. Then, a user will direct whether carry out the reselection of the ornament frame, after using the tablet of a control panel 7 etc., and when carrying out the reselection of the ornament frame, while the sample of an ornament frame is displayed again, when not carrying out the reselection of the ornament frame, he progresses to the step of photographic subject photography. And although a photograph will be taken at the step of photographic subject photography after the portrait image of the user who made the sheet 12 for outdoor daylight interception the tooth-back side compounds with an ornament frame [finishing / selection], the ornament frame in this case is the frame to which the ornament of a pattern, a pattern, etc. is not added.

[0025] Furthermore, adding to the portrait image which had the ornament which the user chose photoed at the step of an image processing will be performed with a personal computer 2. In this case, if it is, processing in which set up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image, and choose the background region except the body subregion, and an ornament is added, and processing which is mentioned later in detail are performed. In addition, in the above-mentioned explanation, the ornament of a pattern, a pattern, etc. is to be chosen in connection with the sample of an ornament frame being chosen at the step of synthetic frame selection, and it is also possible to newly choose an ornament which has at the step of this image processing and is different from an ornament of finishing [selection], and to add it so that it may mention later.

[0026] Then, at the step of a photography result check, the synthetic picture which added the ornament to the portrait image and was acquired will be displayed on the screen of CRT5, and or the directions of whether to re-take a photograph printed by the user who checked the photography result is performed. And if printing is directed, having by the seal printer 3 and printing a synthetic picture to seal paper will be performed, and the advance degree of printing in this case is to be had and displayed by the bar graph on the screen of CRT5 in the step of printing. Then, after returning to the step of the waiting for a coin input, continuing waiting for an injection of coin is performed, displaying a demonstration picture.

[0027] By the way, the personal computer 2 with which the seal vending machine is equipped will function also as portrait image-processing equipment, and this personal computer 2 has the functional composition equipped with various kinds of meanses by which it explains below, referring to each of drawing 4 or drawing 10. That is, it is explanatory drawing which illustrates the procedure at the time of explanatory drawing which illustrates the 1st procedure at the time of drawing 4 setting up a face subregion, and drawing 5 choosing the background region except the set-up face field, and adding an ornament, and explanatory drawing and drawing 7 which illustrate the 2nd procedure at the time of drawing 6 setting up a face subregion are explanatory drawing which illustrates the modification procedure at the time of choosing the background region except the face field and adding an ornament. Moreover, explanatory drawing and drawing 9 which illustrate the procedure at the time of drawing 8 setting up a head part field and a body

subregion are explanatory drawing which illustrates the 2nd procedure at the time of setting up a body subregion, and drawing 10 is explanatory drawing which illustrates the procedure at the time of setting up a beige field.

[0028] (The 1st composition) The personal computer 2 first considered as the 1st composition which functions as portrait image-processing equipment The eye which is the element which constitutes the body portion of a portrait image, for example, the face portion which was most suitable for detecting a person, a nose, eyebrows, a mouth, an ear, a jaw, Or it has a means to set up the position and range of a face subregion based on the profile of the at least one whole element chosen from among the profiles of the whole face etc., for example, a face, and a means to choose the background region except the set-up face subregion, and to add an ornament. And the ornament is to choose the background region except the face subregion and to be added [in this case], after the position and range of a face subregion are set up by template matching using the criteria template corresponding to the profile of the whole face.

[0029] That is, pattern matching while it has by various kinds of criteria templates 21 and the portrait image 22 top which is a subject copy is scanned is performed so that it may illustrate by drawing 4 (b), after preparing beforehand two or more sorts of criteria templates (concentration template) 21 from which a scale which is illustrated by drawing 4 (a) differs, if it was in template matching in this case. And as the degree R of similar will be evaluated after using the following normalization cross-correlation formula (several 1), and illustrated by drawing 4 (c), after the degree R of similar sets up a high position as a position of the face subregion 23, setting up the range of the face subregion 23 is performed here.

[0030] In addition, when two or more faces exist in the picture in this case, the degree R of similar sets up a high position as the 2nd person's face subregion 23 in the field except the 1st person's already detected face subregion 23. Furthermore, while the degree R of similar sets up a high position as a face subregion 23 in the field except the already detected face subregion 23 the same also about the face after the 3rd person, two or more persons' face subregion 23 will be hereafter set up by detecting repeatedly until the degree R of similar becomes small rather than a suitable threshold.

[0031]

[Equation 1]

$$R = \frac{\sum_{l=0}^{n-1} \sum_{k=0}^{m-1} (f[k, l] - \bar{f})(t[k, l] - \bar{t})}{\sqrt{\sum_{l=0}^{n-1} \sum_{k=0}^{m-1} (f[k, l] - \bar{f})^2} \sqrt{\sum_{l=0}^{n-1} \sum_{k=0}^{m-1} (t[k, l] - \bar{t})^2}}$$

$f[k, l]$: 原画像の濃度値

$t[k, l]$: テンプレートの濃度値 (サイズ $m \times n$)

\bar{f} : 原画像の濃度値の平均 値

\bar{t} : テンプレートの濃度値 の平均値

[0032] Furthermore, it is specified as a range which can ornament the background region 25 of the portrait image 22 except the ellipse field 24 which the ellipse field 24 which has a fixed size after being based on the position and range of the face subregion 23 so that it may illustrate by drawing 5 (a) when it did in this way and the position and range of the face subregion 23 were set up will be assumed, and was assumed corresponding to the face subregion 23. And the specified background region 25 is received. The ornament beforehand chosen at the step of synthetic frame selection so that it might illustrate by drawing 5 (b), For example, while the single patterns 26, such as a bubble, change a size, it will be arranged and added for every random position, and controlling so that a pattern 26 is not arranged is performed in the ellipse field 24 which corresponds with the face subregion 23 in this case.

[0033] In addition, although an ornament of finishing [here / selection] is added It is also

possible to arrange as a pattern 26 to which the arrangement angle was changed after expanding or reducing face subregion 23 itself which was not necessarily limited to an ornament of finishing [selection], for example, was set up by template matching. Since a picture like the so-called kaleidoscope pattern will be acquired when it does in this way, 1 stratification-plane white ** will increase more. And as a result to which the above image processings were carried out, it is got blocked, and the synthetic picture 27 which is illustrated by drawing 5 (c), and the pattern 26 which is an ornament do not overlap the face subregion 23 of the portrait image 22 at all, but the synthetic picture 27 which comes to add an ornament only to the background region 25 of the portrait image 22 is acquired. That is, in the personal computer 2 considered as this 1st composition, setting up the position and range of the face subregion 23 is performed, and since the ornament same also into the body portion except the face subregion 23 effective in detecting a person as a background region 25 is added, play nature is to increase more.

[0034] (The 2nd composition) Next, referring to drawing 6, an element which constitutes a face portion is an eye and the functional composition of a personal computer 2 considered as the 2nd composition which sets up the position and range of a face subregion by template matching based on an eye is explained. That is, pattern matching while it has by the criteria template 28 and the portrait image 22 top which is a subject copy is scanned is performed so that it may expand and illustrate by drawing 6 (b), after preparing two or more sorts of criteria templates 28 corresponding to the eye so that it may illustrate by drawing 6 (a) in this case. And if the positions L and R of the eye in the portrait image 22 are detected so that it may illustrate by drawing 6 (c) It is got blocked. the fixed rule (several 2) on the basis of the positions L and R of the detected eye -- By performing calculation according to the following rule which has defined the interrelation of the position of an eye, and the field of a face, finding out a reference point P, and assuming the field of predetermined height h and the predetermined width of face w based on the position of this reference point P A position and a range of the face subregion 23 which are expanded and illustrated by drawing 6 (d) are set up.

[0035]

[Equation 2]

目の位置と顔の領域とのルール

顔の幅: $w = C_w \times (x_r - x_l)$

顔の高さ: $h = C_h \times w$

顔領域の左上X座標: $x_p = x_l - D_x \times w$

顔領域の左上Y座標: $y_p = y_l - D_y \times h$

ただし C_w, C_h, D_x, D_y は適当な定数

[0036] In addition, although the face subregion 23 is to be set up after being based on both eyes in drawing 6, there may not be necessity which is both eyes, for example, it may be one eye, and after being based on elements other than eyes, such as a nose and an ear, of course, you may set up the position and range of the face subregion 23. Furthermore, succeedingly, if the position and range of the face subregion 23 are set up After following the same procedure as it illustrated by drawing 5 (a) and (b) and the 1st composition explained, an ornament will be added to the background region 25 except the face subregion 23 (ellipse field 24), and the same synthetic picture 27 is acquired with having illustrated by drawing 5 (c) as the result.

[0037] By the way, although it is to be arranged for every random position by the technique of the ornament addition illustrated by drawing 5 while the single patterns 26, such as a bubble, change a size So that it may not be restricted to such technique and may illustrate in the modification of drawing 7 the technique piled up with the portrait image 22 after preparing ornament frame 29 with the another portrait image 22 with which the position and range of the face subregion 23 were set up and making blank correspondence field 23a with the face subregion 23 in this ornament frame 29 -- or, although the illustration abbreviation is carried out The technique piled up after changing the transparency in the face subregion 23 in a background region 25 is employable. And of course [when such technique is adopted], the same synthetic

picture 27 is acquired as drawing 5 (c) showed.

[0038] (The 3rd composition) Although the personal computer 2 considered as the 3rd composition is explained succeedingly, referring to drawing 8 The hair and the beard which are the element which constitutes a part for the head to which this personal computer 2 fitted detection of a person following the body portion, i.e., face portion, of a portrait image, Or it is the thing equipped with one element chosen from among the same eye as a face portion, the nose, etc. again, for example, a means to set up the position and range of a head part field based on the peak of the hair, and a means to choose the background region except the set-up head part field, and to add an ornament.

[0039] And with this 3rd composition, the ornament is to choose the background region except the head part field, and to be added by adopting the same technique with having described above, after chroma-key processing detected the peak of the hair, and being based on this peak and setting up the position and range of a head part field. In addition, chroma-key processing here means the processing which presumes the position and range of a head part field etc. which are a body from the property in the position and range of a field which were extracted after extracting the field which the body which has interrupted the anterior of the background specified occupies.

[0040] Namely, chroma-key processing of the portrait image 22 which is the subject copy which is illustrated by drawing 8 (a) in this case is performed. So that it may illustrate by drawing 8 (c), after producing the chroma-key picture 31 which is illustrated by drawing 8 (b), and the chroma-key picture 31 from which it was got blocked and only the body portion 32 which is the upper half of the body of the portrait image 22 was extracted The peak P of the extracted body portion 32 is detected, and setting up the position and range of the head part field 33 by assuming the field of the predetermined height on the basis of the position of this peak P and predetermined width of face is performed. In addition, on the occasion of judgment evaluation of whether an assumption field is the head part field 33, the technique judged from a circumference ratio and surface ratio after [some technique of being already well-known, for example, an assumption field,] being the combination of a circumscription rectangle and a half-ellipse, the technique of setting up a head part field, after making the field below a fixed concentration value into a hair field, etc. are adopted.

[0041] And if it has in such a procedure and the position and range of the head part field 33 are set up After following the same procedure as it illustrated by drawing 5 (a) and (b) and the 1st composition explained, an ornament will be added to the background region 25 except the head part field 33 (ellipse field 24), and the same synthetic picture 27 is acquired with having illustrated by drawing 5 (c) as the result. In addition, although the head part field 33 is set up here after being based on the peak of the hair, there is no necessity on the basis of the peak of the hair, for example, not the hair but a beard and an eye, a nose, eyebrows, a mouth, an ear, the jaw of the folding point of the head, a neck and a neck, and a shoulder being criteria, etc. are natural again. In addition, since the same ornament as a background region 25 is added even to the body portion except a part for a head effective in detecting a person also with the personal computer 2 considered as this 3rd composition, play nature is increasing more.

[0042] Although setting up the position and range of a head part field based on one element which the body portion of a portrait image is a part for a head, and constitutes a part for this head from (the 4th composition) and time with the personal computer 2 considered as the 3rd composition is performed, it is also possible to set up a body subregion based on the body portion of a portrait image itself. Then, the 4th composition explains the case where a personal computer 2 is what sets up a body subregion based on the body portion of a portrait image, for example, the upper half of the body.

[0043] That is, chroma-key processing as well as the 3rd composition having explained on this occasion is performed to the portrait image 22 which is the subject copy which is illustrated by drawing 8 (a), and producing the chroma-key picture 31 which is illustrated by drawing 8 (b), and the chroma-key picture 31 from which it was got blocked and only the body portion 32 of the portrait image 22 was extracted is performed. Then, although it is carrying out the illustration abbreviation after setting up the body subregion 34 by considering as it is that the body portion

32 which is the extracted upper half of the body is the body subregion 34 is performed The synthetic picture to which an ornament will be added to the background region except this body subregion 34, consequently the background region except the body subregion 34 of the portrait image 22 was chosen as, and the ornament was added is acquired.

[0044] in addition, time change which it is not limited to chroma-key processing, for example, is illustrated by drawing 9 although it is performing adopting chroma-key processing and extracting the body portion 32 with this 4th composition -- it is also possible to set up the body subregion 34, after using the dynamic body field detection technique by difference namely, difference before and after it detects body partial 32b after body partial 32a before a predetermined time passes, and a predetermined time pass in this technique, respectively (refer to drawing 9 (a)) and a predetermined time passes -- this difference after computing field 32c (refer to drawing 9 (b)) -- making into the body subregion 34 the range surrounded by field 32c is performed And even if it uses the dynamic body field detection technique, it is checked by the artificers of this invention that the same result as chroma-key processing can be secured.

[0045] (The 5th composition) In the 1st explained above or 4th composition, although setting up the position and range of a body subregion based on at least one element which constitutes the body portion of a portrait image is performed, further again It is also possible to use the personal computer 2 considered as the 5th composition which it is not restricted to these composition and explained below as portrait image-processing equipment. That is, this personal computer 2 is equipped with a means to set up the position and range of a body subregion based on the beige portion of a portrait image, and a means to choose the background region except the body subregion and to add an ornament.

[0046] In the personal computer 2 considered as this 5th composition The RGB chroma-key processing to the portrait image 22 which is the subject copy which is illustrated by drawing 10 (a), That is, after carrying out RGB chroma-key processing in which the field of the color component which suits the following conditions (several 3) is set up as a beige field, The chroma-key picture 35 which consists only of a beige field which is illustrated by drawing 10 (b), and the chroma-key picture 35 from which it was got blocked and only the beige portion 36 of the portrait image 22 was extracted are produced. Then, after following the same procedure as it illustrated by drawing 5 (a) and (b) after setting up the extracted beige portion 36 with the face subregion 23, and the 1st composition explained, an ornament will be added to the background region 25 except the face subregion 23, and the same synthetic picture 27 is acquired with having illustrated by drawing 5 (c) as the result.

[0047]

[Equation 3]

$$Rs \times C_{r1} < Rt < Rs \times C_{r2}$$

$$Gs \times C_{g1} < Gt < Gs \times C_{g2}$$

$$Bs \times C_{b1} < Bt < Bs \times C_{b2}$$

ただし

Rs, Gs, Bs : 基準となる肌色のRGB値

Rt, Gt, Bt : 対象とする領域の画素のRGB値

C_{xx} : 定数

[0048] By the way, in the form of this operation, although an ornament is added to the background region 25 except the face subregion 23, the head part field 33, and the body subregion 34, it is possible by performing image transformation processing only to this background region 25 rather than adding [for example,] an ornament to gradate the color of a background region 25 or to also make it change. Moreover, it is also possible to add an ornament which does not add an ornament to the background region 25 except the face subregion 23 etc., or does not perform image transformation processing, and is called aura along periphery enclosures, such as the face subregion 23.

[0049] And since the face subregion 23 in the portrait image 22 etc. will be conspicuous and

conspicuous from a background region 25 when it does in this way, the advantage that the play nature in a play device increases further is secured. In addition, although [the above explanation] used building the personal computer 2 which functions as portrait image-processing equipment into the seal vending machine which is a play device, of course, you may be what the inclusion place of portrait image-processing equipment is not restricted only to a play device, and is used, being included in the devices and equipment other than a play device.
[0050]

[Effect of the Invention] A means to set up the position and range of a body subregion based on at least one element or beige portion which constitutes the body portion of a portrait image according to the portrait image-processing equipment concerning this invention, Since an ornament is not added within the limits of the body subregion set up based on the element or beige portion which is equipped with a means to choose the background region except the body subregion and to add an ornament, and constitutes the body portion of a portrait image It will be lost that a body portion overlaps an ornament and it will not happen that a body portion hides by the ornament. The effect that play nature can be raised further is acquired obtaining a portrait image with a clear face portion etc., since it becomes possible to add an ornament after making it an ornament not lap about a part for the face portion or a head especially.

[0051] Moreover, since the background region except the range of a body subregion is chosen and image transformation processing can be performed when it has a means to choose the background region except the body subregion and to perform image transformation processing, it becomes possible by gradating the color of a background region or making it change to make a body portion conspicuous. Since an ornament is added along the periphery enclosure of the set-up body subregion when it has a means to add an ornament along the periphery enclosure of a body subregion further again, while emphasizing especially a body portion and making it conspicuous, the effect that play nature can be raised and use expansion of a play device can be aimed at is also acquired.

[Translation done.]